STICHOTHAMNION CYMATOPHILUM (RHODOMELACEAE, RHODOPHYTA) A NEW RECORD FOR MEDITERRANEAN ALGAL FLORA*

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ABSTRACT - The presence of *Stichothamnion cymatophilum* Børgesen (Rhodomelaceae, Rhodophyta) in the island of Alboran (Mediterranean Spain) is reported. Tetrasporangial and gametangial plants of this species, previously known from the Canary Islands only, have been collected in the lower eulittoral zone, growing on the surface of ralfsioid brown algae. Its vegetative and reproductive characteristics are illustrated.

RÉSUMÉ - *Stichothamnion cymatophilum* Børgesen (Rhodomelaceae, Rhodophyta), espèce connue jusqu'à présent seulement des Canaries, a été récolté à l'île d'Alboran (Espagne) dans l'horizon inférieur de l'étage médiolittoral sur les thalles ralfsioïdes. Les thalles végétatifs et gamétophytiques sont illustrés.

KEY WORDS : *Stichothamnion*, new record, Alboran sea.

INTRODUCTION

The genus *Stichothamnion* was established by Børgesen (1930) on material collected in Gran Canaria (Canary Islands). In subsequent years *Stichothamnion cymatophilum* Børgesen has not been reported from any other localities and *Stichothamnion* is regarded by Feldmann (1947) as a Canarian palaeoendemic genus for its obscure affinities with related genera of the Rhodomelaceae. More recently, *S. cymatophilum* has been reported from two other localities of the Canary Islands: Tenerife (Afonso-Carrillo *et al.*, 1979) and Gomera (Haroun Tabraue *et al.*, 1984).

However, another species: *Stichothamnion antillarum* Vroman, which differs from *S. cymatophilum* in its larger dimensions and higher number of pericentral cells, has been described from the Netherlands Antilles (Vroman, 1967).

During a field survey in the island of Alboran (Mediterranean Spain) particular attention was given to the algal vegetation of the eulittoral zone and a rhodomelacean alga, whose morphology agrees with *S. cymatophilum*, was collected growing upon crustose brown algae.

The purpose of this paper, besides reporting *S. cymatophilum* for the first time from the Mediterranean, is to describe the habit and the vegetative and reproductive morphology of the plants collected in the island of Alboran.

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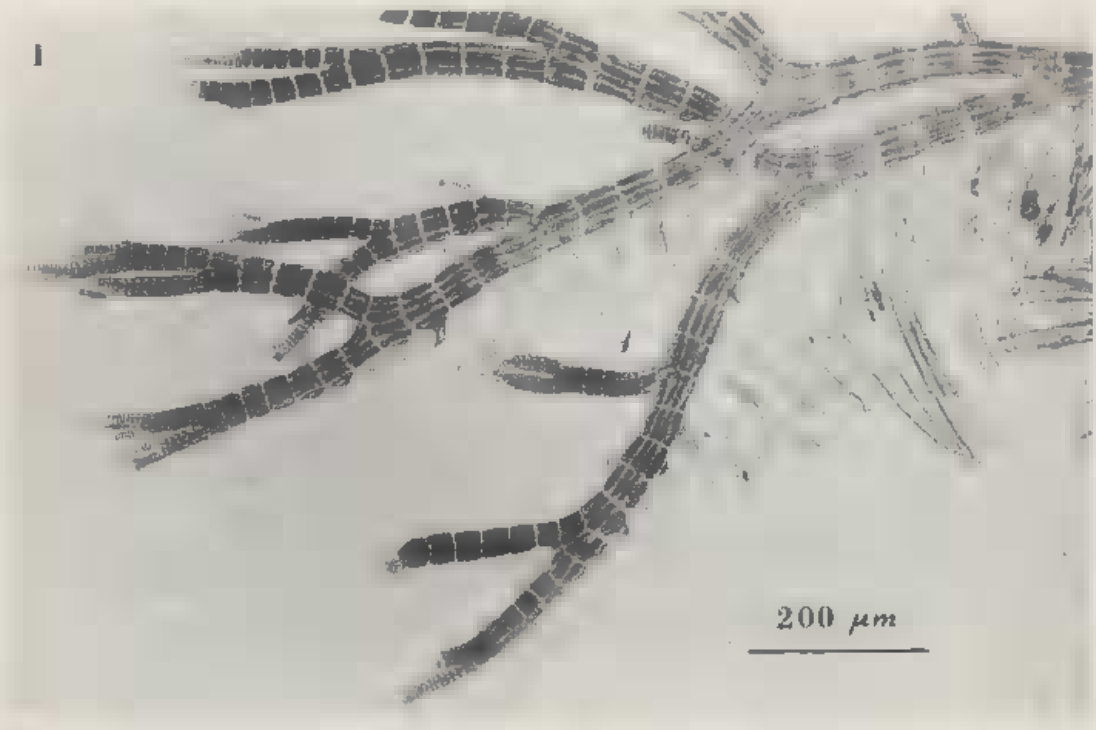


Fig. 1 - *Stichothamnion cymatophilum* Børgesen. Prostrate filaments with erect branches and rhizoids.

MATERIALS AND METHODS

Tetrasporangial and gametangial plants of *Stichothamnion cymatophilum* were collected on 10 September 1985, just outside the harbour of the island of Alboran, in the lower eulittoral zone under moderate to strong wave action.

Collections were fixed and preserved in formalin-glycerin-alcohol-seawater (1:2:2:5). For morphological observations the material was stained in 1% aniline blue and 0.5% HCl, washed in seawater and made permanent on a mixture of 50% Karo (corn syrup), 1% aniline blue and 0.5% HCl. Drawings were made with a camera lucida. Photographs were taken on a Zeiss Axiophot microscope.

Herbarium specimens and slide preparation are deposited in the Herbarium Universitatis Florentinae (FI).

VEGETATIVE AND REPRODUCTIVE MORPHOLOGY

Thallus up to 3 mm high, showing a marked dorsiventrality with an extensive and relatively prominent prostrate basal system bearing erect branches subdichotomously ramified and placed in one row. Prostrate, indeterminate filaments 50-70 μm in diameter, growing in length by means of a large apical cell and attached to the substrate by thickwalled, unicellular rhizoids 250-400 μm long and 15-25(30) μm broad, without digitate tips (Figs. 1, 2). Rhizoids cut off

from the center of the lower pericentral cells of nearly all segments of the prostrate filaments, 1-3 for each segment (Fig. 3). Segments relatively short with a length width ratio of 0.5-0.8. Erect, determinate branches arising at intervals of mostly 3-6 segments from the prostrate filaments, endogenous in origin with segments 30-50 μm high and 40-60 μm in diameter usually a little narrowed at the base, bearing a few lateral branches of similar diameter forming an acute angle with the main branch. Adventitious branchlets rather frequent. Pericentral cells 8, ecorticate. Trichoblasts never branched, found only in the upper end of the determinate branches, spirally arranged and forming only one long filament 15-20 μm in diameter and up to 1-1.5 mm long.

Female plants bearing immature, short-stalked cystocarps near the upper end of the branchlets. Cystocarps globular to urceolate in shape, 150-200 μm broad and 230-280 μm long, tapering upwards to a rather evident neck, with angular pericarp cells more or less isodiametric in surface view, and with smaller sized cells around the ostiolar rim (Fig. 4).

Male plants with subcylindrical, often a little incurved, spermatangial branches 215-270 μm long and 35-40 μm in diameter with a single domeshaped, sterile apical cell or, rarely, without sterile tip. The two lowermost cells of the trichoblast remain sterile, the upper one of these forming a short stalk (Fig. 5).

Tetrasporangial plants, like female plants, more developed in comparison with male plants. Immature tetrasporangia forming slightly spiral series in the upper laterals, one in each segment, 45-50 μm in diameter, somewhat broader than long (Fig. 6).

ECOLOGY

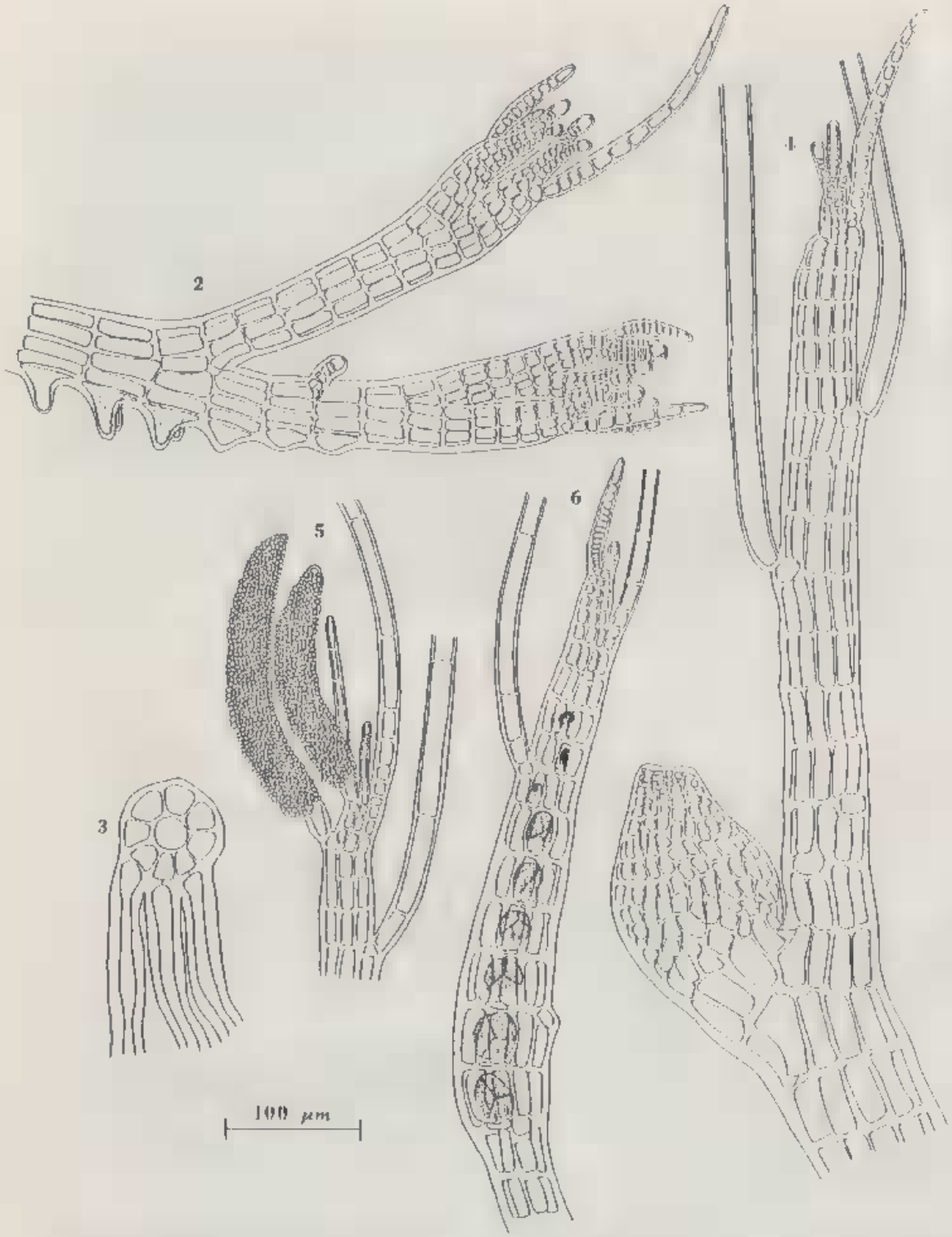
Stichothamnion cymatophilum grows in the lower eulittoral zone together with small tufts of *Compsonema minutum* (C. Agardh) Kuckuck on the surface of crustose brown algae like *Ralfsia verrucosa* (Areschoug) J. Agardh, *Acrospongium ralfsioides* Schiffner and the "*Microspongium gelatinosum*" phase of *Scytosiphon lomentaria* (Lyngbye) Link.

This epiphytic association has been emphasized by Børgesen (1930) as well, and it seems a peculiar characteristic of *S. cymatophilum* because its long and vigourous rhizoids can easily get through the erect or slightly curved perithallial filaments of these ralfsioid brown algae, which provide colonizable substrate to this species.

DISCUSSION AND CONCLUSIONS

The specimens collected on the Island of Alboran are in close agreement with the descriptions and illustrations given by Børgesen (1930). The most distinctive features of the genus are the dorsiventral construction, the endogenous origin of the erect branch system placed in one row on the prostrate filaments, and the unbranched trichoblasts.

The genus *Stichothamnion* shows some similarities with *Dasythamnion*, a monotypic genus described by Dangeard (1951) and later renamed *Pycnothamnion* (Dangeard, 1952). *Pycnothamnion crustaceum* Dangeard resembles *Stichothamnion cymatophilum* in the dorsiventral construction, the number of pericentral cells, the arrangement of reproductive structures, and the unbranched trichoblasts. Points of difference include an exogenous origin of the determinate



Figs. 2-6: *Stichothamnion cymatophilum* Borgesen. Fig. 2: Apical portion of the prostrate filament with normal and adventitious erect branch. Fig. 3: Transverse section of prostrate filament with rhizoids cut off from pericentral cells. Fig. 4: Branch apex with immature cystocarp. Fig. 5: Spermatangial branches. Fig. 6: Branch apex with immature tetrasporangia.

branches and a greater frequency of intercalary, adventitious erect branches which, on the contrary, are endogenous in origin and irregularly disposed on the dorsal side of the prostrate filaments. Therefore in *P. crustaceum* the erect branch system takes the aspect of a compact fringe no more than 1 mm high. A further difference, probably due to the diversity in the substrate, is found in the apices of the rhizoids which in *P. crustaceum* are dilated in digitate tips.

Stichothamnion cymatophilum represents a new addition to the algal flora of the Mediterranean. However, considering the fact that the algal vegetation of the Alboran sea is largely Atlantic in its affinities, the presence of this species along rocky shores of the island of Alboran is not surprising. Nevertheless, it is probable that the distribution of *S. cymatophilum* in the Mediterranean is limited to only the western areas of the African coastal region where, being small and scattered over crustose brown algae, it has been over looked until now.

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